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AUTHOR Bierschenk, Bernhard
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ABSTRACT

Implicit figuration and subjective interpretation make up the conventional basis of the classical discussion of the comprehensiveness and aesthetic quality of the metaphor. Its function and use in social science research is illustrated as a background to a radically different methodological approach. By means of a Perspective Text Analysis, it is demonstrated that metaphor has to be reconceived as the Re-naming Instrument. The hypothesis tested is that the metaphor carries ecological information. Results of the analysis show that the metaphor has to be treated as a self-contained verbal expression of affordance. By naming the affordance (i.e., what object and events in the environment offer), events of a certain kind are brought into perspective. One table illustrates algorithmic processing of a metaphoric sentence. A 24-item list of references is included. (Author/SLD)

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Bernhard Bierschenk

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Cognitive Science Research
Lund University
Sweden

Postal address

Cognitive Science Research
P.O. Box 7080
S-220 07 LUND
SWEDEN

Editor

Bernhard Bierschenk
Department of Psychology
Lund University

Adm. editor

Helge Helmersson
Department of Business Adm.
Lund University

Abstract

Implicit figuration and subjective interpretation make up the conventional basis of the classical discussion of the comprehensiveness and aesthetic quality of the metaphor. Its function and use in Social Science is illustrated as a background to a radical different methodological approach. By means of Perspective Text Analysis it is demonstrated that the metaphor has to be conceived as the Re-naming Instrument. The hypothesis tested is that the metaphor carries ecological information. The results of the analysis show that the metaphor has to be treated as a self-contained verbal expression of affordance. By naming the affordance, i. e. what object and events in the environment offer, events of a certain kind are brought into perspective.

The unfolding of the Agent-action-Objective (AaO) axiom into a system was initiated by a formalism for an algorithmic manipulation of both "intention" and "orientation". What became important from a cognitive point of view was an analysis of the assumptions underlying such notions as "information" (Bierschenk, 1984 a), "meaning" (Bierschenk, 1984 b), "understanding" (Bierschenk, 1986), and "knowledge" (Bierschenk, 1990 a) as well as "invariance" (Bierschenk, 1990 b). These articles present the double helical structure that has been instrumental in the investigation of (1) the design and measuring variables for a demonstrative definition of knowability and (2) the transformational steps involved in the process of picking up what is worthwhile to know of the world one lives in.

By manipulating and twisting the system components within a three-dimensional space, the course of the anticipated process has been advanced to a point where the whole configuration undergoes a "perceptual shift". As a result, the cooperative interaction between environment and organism is no longer the objective of a literal or mechanistic interpretation of information. Instead, it is the non-literal, i. e. metaphoric consideration that will be made the starting-point for the operating process.

Conceptions of the Metaphor

From what can be abstracted by reading the scientific literature on metaphors and metaphoric language, two basic notions, an Anglo-saxon and a Central European can be distinguished. Because the Anglo-saxon view is the dominating one, it shall be presented first by a quotation from the American Heritage Dictionary (1970, p. 825) definition:

"A figure of speech in which a term is transferred from the object it ordinarily designates to an object it may designate only by implicit comparison or analogy as in the phrase *evening of life*. (...)"

The central term of this definition is 'transference' which suffices to explain the etymological interpretation of '*meta*'.

It is deduced from the Greek term transference which originated from *metapherein*, to transfer: *meta-* (involving change) + *pherein* = to bear.

In the notions of figure or image, substitution or comparison, conflict or interaction, transfer or carrying over, the shift or replacement is apprehended as the inherent nature and function of a metaphor. Moreover, this way of conceiving the metaphor had and continues to have profound consequences regarding the study of its very nature. In principle, the notion is taken to cover feature analysis and similarity judgment as the suitable research strategy. Its operationalization has emerged in different types of resemblance studies. Resemblance is literally defined by the American Heritage Dictionary (1970, p. 1106) as:

"The condition or quality of resembling something; similarity in nature, form, or appearance; likeness."

Both definitions lay the ground for a semantic-logical approach to the study of metaphoric expressions. In the trace of the development of a scientific language for the Social Sciences and Humanities, the semantic-logical approach became almost the

only accepted way of describing mental reality. Different schools developed with respect to the capabilities of language to designate mental processes and states. The scientific stress put on language is the non-ambiguity requirement: language shall be taken literally and consequently, shall be capable of describing a reality, preferably physical, as objectively as possible. The analysis of language concerns, therefore, the question of what it signifies in relation to reality and thought. The fundamental historical and theoretical consistent idea is that a strictly formal approach has to be intolerant to a non-literal or non-mechanistic approach to any language expression. In sum, of obvious concern for the Anglo-saxon definition is to capture the composition (frames) of the metaphor and to approach it associatively and computationally.

The Central European definition, in contrast, stresses the transcendental character of the metaphor. According to the Duden Fremdwörterbuch (1982) 'meta' means 'ver' as in 'Veränderung' in the sense of 'Umwandlung' which stands for transformation instead of transference. This transformation means transcending the all too concrete thing perspective by passing beyond it. This is to say, the metaphoric expression allows for the pick up of the ecological affordance (Gibson, 1979, p. 127), i. e. the prototypical, carried by objects and events in the environment.

When Black (1979, p. 25) states that there can be no dictionary of metaphors, this must be taken as a most striking example of the metaphor as lying outside the scope of grammar. He discusses metaphoric language from the point of view of creation, that is, the literary definition of metaphor, for which no rules of violation can be set up. Thus, metaphors make possible to express a perspective that cannot be expressed in another way except with longer formulations. This argument may be further amplified with Sadock's (1979, p. 49) observation that, because of some metaphors being so obvious that they show up in several languages, they "might be misdescribed as a universal tendency of thought".

Polanyi and Prosch (1975, p. 75-76) notice that Black has "tacit understanding" of metaphor but fails to unravel "this secret explicitly". These authors analyse Black's approach from a holistic point of view, which converges into an explanation of the metaphor as a "focal object" into which experience of our own lives are symbolized and "carries us away" by a "powerful and moving image".

Experimental Approaches

Since Aristotle judged all metaphoric expressions to pertain to the scope of literature, poetics, rhetorics and politics, metaphors have been treated as violations of linguistic models and rules. When Richards (1936) proposed a terminology for talking about metaphors it was taken from rhetorics. In analytical terms the first part of a metaphoric sentence were associated with "tenor", or "topic" while the second part got the name "vehicle", a general term for transmitting. Apparent incompatibility of appearance is conventionally called "tensive view". It refers to an emotional quality. The "cause" of the metaphoric effect is termed "ground". Thus it is easy to understand why the effect of the metaphor is conceived as a figure, and why the study of its cognitive anchorage has attracted psychologists who are interested in figurative speech, analogical reasoning, and mental processes in general. The key to comprehending metaphors may be illustrated by the following example:

Metaphoric sentence
(1) He is a lion
(2) He is brave as a lion
(3) He is a lion in battle

The process of comprehending is involved in the semantic definition. From the point of view of semantics, metaphoric sentences as "figures" of language necessarily must be treated as an extra linguistic phenomenon, otherwise linguistic problems arise. Cohen (1979) distinguishes between "empirical" or immediately evident features and inferential features. He offers the following proposal: A literal comprehension of a sentence implies that its inferential features are cancelled while a metaphoric comprehension results in a cancelling of the empirical features. In the statement (1) a model of semantic features would urge the reader to infer what features of a lion that could be attributed to 'He'. Cohen (1979, p. 65) claims that it is the "richness in possible meaning" of a natural language sentence that constitutes its metaphorical nature. As a consequence, all statements (1-3) are metaphors, though the "analytical urge" operates to various degrees. The features of comparison are implicit, and thus have to be "figured" or inferred from semantic knowledge. It follows that interpretation would have to be conceived of as a basic component in a theory of metaphoric comprehension.

Analogical Reasoning

Problems of metaphoric comprehension have been in the focus of Sternberg, Tourgangeau, and Nigro (1979). In principle, they present a proposal for investigation of analogies of the following design:

Analogy
Rat : Pig :: Goat_____; (A) Chimpanzee, (B) Cow
(C) Rabbit, (D) Sheep

From a semantic point of view the example illustrates the absence of an ideal solution. No choice of an animal gives an perfect answer. According to the authors preference, the closest solution is contained in the following order: (B), (D), (C), and (A).

Based on the example, conventional strategies are discussed, for example, the possibility of scaling similarity. But this procedure would quickly become impracticable with large numbers of objects and combinations. The authors instead chose an alternative, which is the well-known Semantic Differential technique.

Underlying this model of analogy comprehension is the assumption of association. Accordingly, processing an analogy implies that the subjects in the experiment classify reality in terms of primitives or semantic features which are somehow sensed through the elements of language. This conceptions presupposes the demonstrated dichotomy between reality and semantic representation. Behavioural semantics require the mapping of the arguments if the analogy shall be recognized. The propositional form of the sentence frame only serves as a logical connection (is/are, like, as ... as, and equivalent functions) which may be detected as in any natural language expression.

Phenomenological Givens in Social Frames

From the perspective of Gestalt psychology or social psychology there seems to be a common conception of metaphor what ever way it is looked upon. The central notion seems to be "transference", which suffices to explain the etymological interpretation of "meta". The normal case, namely, is that change is being related to objects indicating shifts. Schön (1979) introduces the term "generative metaphor" as the make-shift instrument for the following analogy:

Metaphoric sentence
Paintbrush is a kind of pump

The sentence presents two types of objects belonging to different technical domains. His "generative metaphor" is thought to be an instrument for regrouping the features of one frame through comparing with the features of another frame. Note, the frame does not place anything into its context, but it always contextualizes the features. The predicted effect is that individuals start to construct a better paintbrush, since the features of the pump-frame can be successfully mapped onto the paintbrush-frame, i. e. the space between the bristles come into the foreground as channels.

The frames of the two objects are different (Schön throughout uses the term "conflicting frames") and without the double exposure they could not interact in generating the new pump-working paintbrush. It is quite clear from Schön's account of the process that it has not been direct. The researchers had to work before their invention was complete, i. e. changing the position of the bristles to make functioning channels.

Schön obviously makes explicit reference to psychological experiments on contour coding, especially what has been well-known by the name of figure-ground perception in Gestalt theory. Schön (1979, p. 274) makes the statement:

"... two different ways of seeing (...) are made to come together to form a new integrating image; it is as though, in the familiar gestalt figure, one managed to find a way to see both vase and profiles at once!"

In a note he explains that an integrating image would be to see the profiles "pressing their noses into a vase" (Schön, 1979, p. 283). This kind of discussion invites to some comments.

In Gestalt psychology a general approach has to do with the manipulation of a figure whose area, like a field, may have its shapes reorganized. The ground is shapeless and usually extends beyond the figure. Thus, perception of the shape or a drawing depends on the laws of organization, which raises the question of what makes the shape of the particular areas to be seen as figure and what makes them be seen as ground. If Schön understands the line function in the same sense as Attneave (1971) does, namely, that "one line can have two shapes" instead of two functions, then it is not surprising that he elaborates on background and foreground implying depth perception, which lies outside the scope of the perception of object-ambiguous figures. Moreover, Hochberg (1978) has explicitly stated that perception research on the effect of background for design has not been carried out.

Schön arguments along the following line: The frames of the two objects are "conflicting". But without the simultaneous exposure within a linguistic propositional form they cannot interact and thus generate the new "pump-working paintbrush". It is

worth noting that this process is inferential. This is to say that the process is conceived as mediate but not immediate. Technologists had to work before the invention (design) was completed. Changing the position of the bristles to make the analog functioning explicit is the outcome of elaboration. Schön's focus is on the "as ... if" function which is rooted in phenomenological perception. Phenomenological perception, when used within the framework of social psychology (Asch, 1952) assumes phenomenological givens. In this tradition, the perception of stimuli or selective awareness implies "conscious experience". It is the experience of such givens that attracts Schön. Mediated perception is the classical assumption and governed by the presupposition of threshold values, influenceable by drives, emotions, and familiarity with the phenomenon. Thus the conflicting-frame hypothesis is based on the Frustration-Aggression-Displacement theory, which is an expression of the Drive-Motive-Reduction theory within a social context. The latter is anchored in the Balance or Congruity theory. As a consequence, conflicting frames become integrated into a third frame, which is the resolution or discharge of tension caused by the conflicting frames. It follows that the resulting behavioural event becomes disconnected from the original ones.

The line of analogical reasoning taken by Schön concerns the projective (= mapping) function of a frame. Depending on differences in social and cultural anchorage of a single individual, particular customs and other details get the same role as has been assigned to the subgroups of features. Image construction is conceived as frame construction and builds on the assumption that groups of features become incorporated into the image. Moreover, Schön (1979, p. 265) assumes the operation of symptomatic stereotypes in the selection of a particular subgroup of features. When a stereotype has been established, there is no longer any need for the existence of real differences in order to revoke the stereotype. This is what Schön (1979, p. 265) calls the "normative leap".

This argumentation is based on the widely defended view in social psychology that stereotypes are always wrong. This view is held independent of the definition of error. An adoption of it, therefore, can only be justified when, as in Schön's case, the criterion for truth is the correspondence in details, i. e. in the literal or analytic sense. However, if stereotypes are conceived of as abstractions or extractions of invariants, then stereotypes reflect differences in structure, void of false symptoms and thus, in no need of any diagnostic or projective prescription.

The Assumption of Structural Similarity

Thus far, for an understanding of metaphorical expressions, critical semantic features have been identified and listed on the basis of classes with clear cut boundaries. A different approach is taken by Verbrugge and McCarrell (1977) in a series of experiments on metaphoric comprehension. The underlying assumption is that an awareness of membership requires a structure that, if it exists, also can be named. In other words, a name that has structure, signifies a category. They assume with Rosch (1975) the existence of natural categories, whose characteristics are different compared to the "artificial categories" employed in science.

Event structure of metaphor. This problem is particular crucial when an event shall be used as prompt. Rosch (1975) solved it by visualizing the acquisition category as the colour and the prompt or prime as the word for it. Verbrugge and McCarrell (1977, pp. 525-526) follow in their methodological design this reasoning, although they do not postulate recognition of pre-existing attributes associated with "Topic" (their term for Tenor) nor a transfer of such attributes pre-associated with "Vehicles".

The authors concentrate on the "Ground". Instead of feature similarity between Topic and Vehicle they prefer to argue in terms of structural similarity. Further, in their discussion, metaphoric comprehension means perception of events. Consequently, the significant methodological problem to be solved concerns the demonstration of whether and to what extent it is possible to capture the event structure of metaphors by means of a specification of resemblance. The "structure of resemblance" is circumscribed in terms of abstract relations, but seems to be used in correspondence with the presented dictionary definition.

Experimental Decomposition of Metaphor System

The experimenters themselves have created a great obstacle to the experimental study of metaphoric comprehension by disregarding the relational properties of the metaphor. The structural unity of a metaphor by necessity must have been lost in the experiment. What actually has been studied is the correlational dependency between the components, but not the linkage relation of the components defining the function of the metaphor system. The obvious decomposing tendency and regression toward the semantic-logic frame of reference in their argumentation will be illustrated with generated metaphoric sentences:

Metaphoric sentence
(1) Tree trunks are straws for thirsty leaves and branches
(2) Tree trunks are pillars for a roof of leaves and branches

In their initial discussion on transformational and structural invariances (Verbrugge & McCarrell, 1977, pp. 494-495) it is assumed that an event could be characterized by either type or both. The anticipated event perception therefore would imply that both are present in the first sentence, because "the flow of fluid" and "the tubular structure" resemble the invariants of straw. The second sentence would be the case where the structural invariant is present in the "solid column" inasmuch as the second example represents a different structure. But nothing is said about the transformation into solid columns. Despite of this insufficiency, the authors offer the following resemblances:

Ground
(1) are tubes which conduct water to where it's needed
(2) provide support for something above them

From a theoretical point of view, the authors have disregarded the fact that transformation exerts over both structure and form. Otherwise one should have distinguished between structural and formal (or logical) invariance. Moreover, direct perception implies that an event is only perceivable through a structure. It follows, to capture an event requires the imposition of a form in order to conserve its structure. Finally, structure and form must be present in both concepts of the metaphoric sentences (1, 2), otherwise it should be impossible to directly perceive its invariants. Both a tree trunk and a straw have structure. On the other hand, a tube has form, the rest is function. Pillars have the same form but a different function. This is evident from the lexical entry 'trunk', which may be used in the sense of 'pillar' or 'tube', senses which are derived from only the logical (lexico-semantic) part of the compound. In contrast, straw is used in a transformed sense ('the last straw').

To explain in language the logics of a tube or a pillar require the specification of their literal meaning by use of linguistic elements. The tube as well as the pillar are

artificial constructs being given concreteness through form and may therefore be perceived as closely related to a ground in the literal sense. Thus, the grounds (1, 2) should have identical formulations as to the language level suitable to express the environmental condition. With respect to function, tube may be perceived as having more dynamic function than a pillar, which would be expected to show up in language. Finally, the metaphoric sentences (1, 2) have become examples of the structural-formal distinction (Becker, 1978, p. 39). In a structural view of perception, leaves and branches may be thirsty, i. e. the dynamics of their ecological functioning is integrated in their description. In a static view, however, they become bricks of a construction. Consequently, if one concept contributes with form invariance only, a simile or analogy is likely to be at hand. It follows that the interesting thing to try is to capture the asymmetry that lies in the way in which formal and structural properties are activated and brought to cooperate in the process of metaphoric transformation.

In a further discussion on language and perception, Verbrugge (1977) strives to connect his analysis closer to the Gibsonian attack on "immanent formism" although within the language of figuration: perception and articulation as figurative activity. In the article, Verbrugge centred his discussion on the following "true" metaphor:

Metaphoric sentence
An empty prison cell is like a Venus fly trap, waiting for its next victim to enter

According to Verbrugge, the resemblance is essentially figural, because 'A prison cell' and 'a Venus fly trap' belong to very different domains and are usually involved in very different events. He explains the comprehension of the essence of the resemblance as some intermediary bridge from inferential to direct perception (Verbrugge, 1977, p. 378). The figural bridge is explained as one's ability to specify a perceived event wordly and illustrated with the generated analogy:

Metaphoric sentence
An empty prison cell is like seeing a room through Venetian blinds

He notices the relationships by presenting them in terms of a symbolic analogy. Perception concerns the event and not the bars on a cell window or the slats on Venetian blinds, which, according to Verbrugge, can be vertical or horizontal. The individual (like an organism's orientation in the environment) positions himself in front of the bars (blinds) and takes in the cell (room). Though, the problem with his explanation is that 'prison cell' and 'room' converge toward the same kind of spatial orientation, and consequently a frame without a specified event. To capture ecological invariants some psychological valid abstraction must be perceived. For example, a prison cell should be much higher in affordance, if one imagines to orient from inside out.

In an attempt to clarify his position further, Verbrugge tries another example:

Metaphoric sentence
An enemy fortress is like the open mouth of a killer whale, when a fish accidently swims in

At a first glance, it seems that this example is far better suited for an explanation of the dynamic aspect. Unfortunately, its orientation is toward the act of killing and

eating happening in a dangerous place, although by chance. However, for the intended ecological approach to the study of metaphors, it should be noted that the concepts of "intention" and "orientation" play a central role as illustrated by the Visual Cliff experiments (Gibson & Walk, 1960). Yet, despite this fact, Verbrugge assumes that the 'victim' of a Venus fly trap enters by chance. It would have been more fruitful to adopt the teleonomic view in the discussion and to conceive the necessity and inevitability of the course of events in the discussion of "affordance". But he may not have been aware of the explicit cues, such as 'empty' and 'next'. It follows that intentionality must be operating. If so, it may be worthwhile to reconsider the Venus fly trap metaphor on the basis of Perspective Text Analysis (Bierschenk & Bierschenk, 1986)

The Perspective of the Metaphor

By anchoring the metaphor in transcendental logics, i.e. the logics of affinity inherent in the Kantian schema, its meaning is made dependent on the expression of an "intended" and "oriented" schematization. In order to get hold of the intention and to keep it apart from the orientation it will be necessary to process the metaphoric expression on the basis of the AaO formula, which develops into the following general systems expression $(AaO)_n = (A_n \text{ a } O_n)$

where

A-linkage = A_n = Text /X/ A_{n-1}/ $(A_{n-1}+O_{n-1})$

O-linkage = O_n = Text /Y/ $(A_{n+1}+O_{n+1})$

Multiple linkage = $((AaO_n) \text{ a } (AaO)_{n+1})_{n+2}$

In general, any string of letters or part of a clause is defined as a conceptualization of an observation if all three constitutive components are present. In principle, an Agent dummy (A) is substituted with the immediately preceding agent (A_{n+1}) dummy is language specific (e. g. the string 'it') the immediately preceding block ($A_{n-1} + O_{n-1}$) is the substitute. The object dummy (O) is substituted with the immediately succeeding block ($A_{n-1} + O_{n-1}$).

The linkage mechanism illustrates how the Schema axiom guides and controls the development into a dynamic algorithmic procedure characterizing the functional, structural and dynamic aspects of a text. Processing the text of the metaphoric sentence (Tab. 1) manifests itself in the application of a package of programs written by Helmersson (1991) for IBM compatible Personal Computers.

Table 1.

Algorithmic processing of a metaphoric sentence

String	Code	Supplementation
(.)	00	
(that)	01	
An	30	
empty	30	
prison	30	
cell	30	
is	40	
like	50	
a	50	
Venus	50	
fly	50	
trap	50	
,	01	
(A)aO	30	An empty prison cell
waiting	40	
for	80	
its	80	
next	80	
victim	80	
to	01	
(A)aO	30	An empty prison cell
enter	40	
Aa(O)	50	Y
.	0090	

In the moment of text production, an observation is put into perspective. The graphical reproduction of the perspectivation is essentially the pattern of strings demarcated by the points at the beginning and the end of the metaphoric sentence (Code 00). That this pattern of strings carries symbolic information commonly associated with words is of no relevance in a systemic specification of information.

In the actual sentence, the algorithm has also to work with clause openers (Code 01). They have the function of demarcating the boundaries of a clause. The clause opener (that) enclosed by parentheses carries this technical function at the beginning of the sentence. In the trace of processing the strings the algorithm defines on purely formal grounds the organizational frame of the sentence pattern. But this frame is insuffient for processing the perspective latent in the verbal flow. What is required for a final analysis is a structural component. This component is represented by the verb (Code 40). Without the identification of a verb it is impossible for the algorithm to disclose the perspective. The copula 'is' has traditionally been assigned the task to connect a main word with an attribute in a symmetrical relation. In

contrast, the algorithm recognizes 'is' in the same way as any other verb in a directed, i. e. asymmetrical relation.

What is missing in conventional text analysis is the (AaO) formula as foundation for describing mental reality. It affords the strings to be identified and processed by a coherent functioning mechanism. This is achieved through the distinction of the Agent as starting-point of an action and its separation from its viewpoints (Codes 50, 80). The mechanism executes its work by searching for the viewpoints marking the orientation. These codes give directiveness to the Agent-function. Any string preceding the verb is identified as agent or agency (Code 30). Of course, the realisation of the formal components of the Schema varies at the phenomenological level of the sentence. Therefore, the algorithm works with dummies, i. e. an Agent dummy ((A)aO), and an Objective dummy (Aa(O)) which are put into the text where the variables are implicit or missing.

The formal relations of the (AaO) formula must have an explicit embodiment in the form of a differential equation. In order to solve the equations coming into existence, a step is needed where the dummies are substituted through supplementation with text strings. A recursive procedure has been developed which makes it possible to solve such a system of equations. In Table 1, the result is given as "Supplementation".

One main principle governing the working of the mechanism is that the Objective component of the sentence has a forward development. This means that the Y-variable is a priori an unknown. First after the whole analysis cycle has been carried through it is possible to solve for the variable 'Y'.

The substitution of the Y-variable has to be made on the basis of identified groupings. Perspective control of the viewpoints rests on the control of the agent. It is obvious that the agent of the metaphoric sentence is systematically related with 'Venus fly trap' and variable 'Y'. It follows that these two viewpoints form a "natural group" whose prototypical character is the result of sorting the surface features of the objects and events. Their contents are easily scrutinized and comprehended as 'Trap'. Consequently, Y = Trap.

The other conceptual component (80) extends the scope of the metaphor. It represents the setpoint. To fulfil the transformation, something has to give directiveness to the intention. Extending the scope of the sentence implies a further designation of the prototypical, i. e. the ecological significance. The given analytical concepts ('Trap', 'Victim') can only be conceived of as the initial states of the process and thus, as the prototypical naming of a structure. The meaning of this intrasystemic analysis only appears in the Kantian schema as synthesis.

Extracting the affordance of the metaphor is possible only through the cooperation of Agent and Objective. The mechanism inherent in the metaphor executes this relationship as the result of an asymmetrical relation between agent and viewpoints. A description of the agent through the prototypical character of the concentrated viewpoints displays the central aspect, a negative affordance, which has come into view of the empirical agent.

Discussion

The transformational process inherent in the metaphor shows that one agent has operated. It is obvious that the agent of the sentence is systematically related with the identified group (analytical concept). The crystallization of a system of analytical concepts (variables) is synonymous with the definition of the states of a system. Analytical concepts originate from argumentation. Logically, they are independent of

each other and function as variables. The way in which different variables would be linked give rise to a course which would unfold the event structure. Thus it is the variable that determines the terminal state of the structure. The dynamics of such a process and the constraints that various states enforce on this process would create the synthetic concepts as the necessary terms in a network unfolding the Figure component of the metaphor.

The brain seems to differentiate perception and behaviour on the basis of the AaO formula. It is the conceptual tool for integrating and transcending separate events. Therefore, the idea of a Schema existing not only in cognition but also in language has been tested. As has become obvious at the symbolic and conceptual levels, the environment is not only reacted to and acted upon, but is understood through the processing of information picked up from symbols. The AaO formula marks the structural aspect of a graphical or symbolic expression. It incorporates the assumption that the intention of the Agent governs the choice of viewpoints, which means that the perspective is latent in the verbal flow. In general, any awareness that can be formalized into text would be an expression of an intentional process. The algorithmic processing has shown that the perspective of the metaphoric sentence can be differentiated from its viewpoints. Further, the processing made possible an ordered, coherent, and consistent presentation of the quality in the verbal expression and consequently, the naming of the ecological affordance carried by the expression.

Thus, the thesis put forward is that human language must be recognized as a self-referential system. The states of such a system are determined by mutual dependencies of its constitutive components. Self-referentiality implies that no master interpretation can be forced upon the metaphoric or any other sentence.

The basic cues by which Perspective Text Analysis processes the origin and nature of the object-event relationship expressed in natural language are topological in kind. Topology implies some kind of spatialization. If singularity is conceived as the real basis for ecological invariants, the analytical work presupposes a setting up of terminal states and their naming by means of analytical concepts. These concepts are specified through the operations of Perspective Text Analysis distinguishing them from the textual context. This distinction is determined by the operations of extraction and abstraction and assigning a prototypical name (= value) to the concept. If the concept can be named it represents something categorizable. Categorizability is the starting-point for some more requirements on the topological routines that would establish the dynamics and linkages governing and constraining the developmental process. They concern the relations between the components of the concepts. The components namely specify the phase space of the phenomenon within which an attractor can develop into a significant final state, marked by a singularity giving identity to the phenomenon.

References

Attneave, F. (1971, December). Multistability in perception. *Scientific American*, pp. 63-71.

Becker, R. (1978). *Das Problem mit dem Netzhautbild (The problem with the image)*. Bern: Huber.

Bierschenk, B. (1984 a). *Steering mechanisms for knowability* (Kognitionsvetenskaplig forskning, No. 1). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service No. ED 264 246, TM 850 437)

Bierschenk, B. (1984 b). *The split between meaning and being* (Kognitionsvetenskaplig forskning, No. 3). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service No. SO 021 381)

Bierschenk, B. (1990 a). *Simulation of action-event cooperation. Emergence of knowing* (Kognitionsvetenskaplig forskning, No. 32). Lund, Sweden: Lund University, Department of Psychology.

Bierschenk, B. (1990 b). *Behavioural semantics. A comparison between topologic and algebraic scaling in the measurement of human dignity* (Kognitionsvetenskaplig forskning, No. 33). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED 320 914, TM 014 795)

Bierschenk, B. (1986). *The cult of understanding* (Kognitionsvetenskaplig forskning, No. 15). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No ED 295 944, TM 011 263)

Bierschenk, B., & Bierschenk, I. (1986 b). *Concept formulation. Part II. Measurement of formulation processes* (Kognitionsvetenskaplig forskning, No. 11). Lund, Sweden: Lund University, Department of Psychology. (ERIC Reproduction Service No. ED 275 160, TM 011 260)

Black, M. (1979). More about metaphor. In A. Ortony (Ed.), *Metaphor and thought* (pp. 20-43). Cambridge, MA: Cambridge University Press.

Cohen, L. J. (1979). The semantics of metaphors. In A. Ortony (Ed.), *Metaphor and thought* (pp. 64-77). Cambridge, MA: Cambridge University Press.

Gibson, E. J., & Walk, R. D. (1960). The visual cliff. *Scientific American, 202*, 64-71.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Helmersson, H. (1991). Pertex (Computer program). Lund, Sweden: Lund University, Department of Business Administration.

Hochberg, J. E. (1978). *Perception*. Englewood Cliffs, NJ: Prentice-Hall.

Morris, V. (Ed.) (1970). *The American heritage dictionary of the English language*. Boston: American Heritage Publishing Co.

Polanyi, M., & Prosch, H. (1975). *Meaning*. Chicago: University of Chicago Press.

Richards, I. A. (Ed.). (1936). *The philosophy of rhetoric*. London: Oxford University Press.

Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology: General, 104*, 192-233.

Sadock, J. (1979). Figurative speech and linguistics. In A. Ortony (Ed.), *Metaphor and thought* (pp. 46-63). Cambridge, MA: Cambridge University Press.

Schön, D. A. (1979). Generative metaphor: A perspective on problem-setting in social policy. In A. Ortony (Ed.), *Metaphor and thought* (pp. 254-283). Cambridge, MA: Cambridge University Press.

Sternberg, R. J., Tourangeau, R., & Nigro, G. Metaphor, induction and social policy: The convergence of macroscopic and microscopic views. In A. Ortony (Ed.), *Metaphor and thought* (pp. 325-353). Cambridge, MA: Cambridge University Press.

Verbrugge, R. R. (1977). Resemblances in language and perception. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing. Toward an ecological psychology* (pp. 365-389). Hillsdale, NJ: Erlbaum.

Verbrugge, R. R., & McCarrell, N. S. (1977). Metaphoric comprehension: Studies in reminding and resembling. *Cognitive Psychology, 9*, 494-533.

Wissenschaftlicher Rat der Dudenredaktion. (1982). *Das Fremdwörterbuch*. Mannheim, Germany: Bibliographisches Institut.